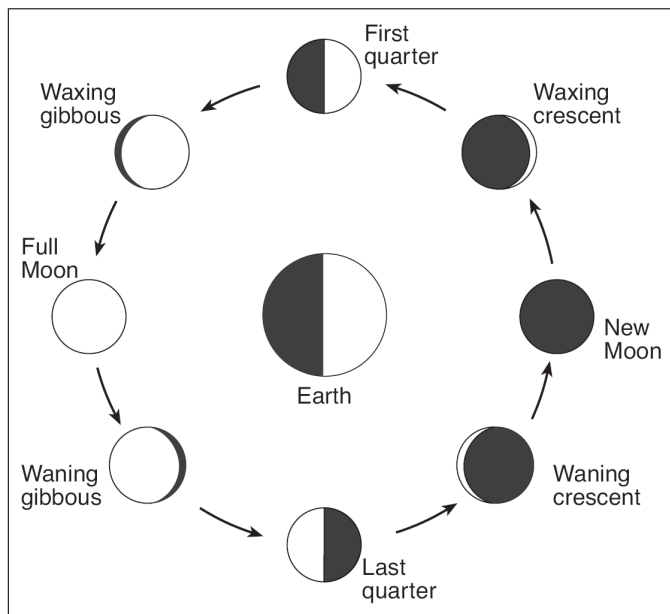


Eccentricity

1. Base your answer to the following question on

the diagram below, which shows positions of the Moon in its orbit and phases of the Moon as viewed from New York State.

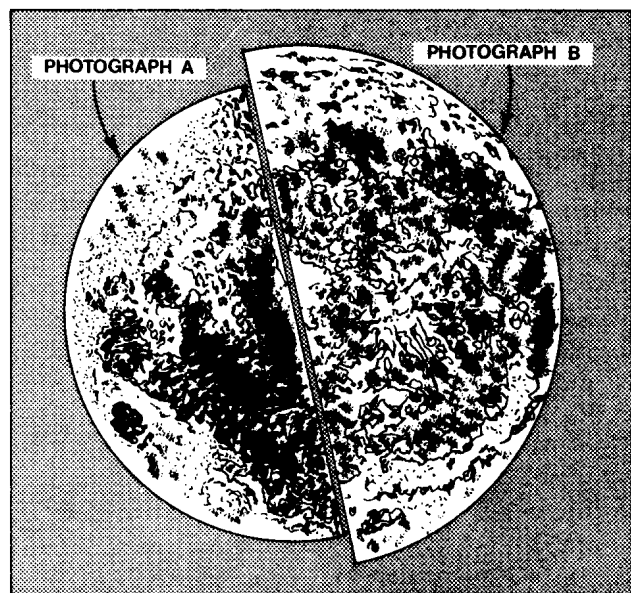


(Not drawn to scale)

What is the eccentricity of the Moon's orbit?

- A) 0.017 B) 0.055 C) 0.386 D) 0.723

2. The diagram below represents two photographs of the Moon, *A* and *B*, taken at full moon phase several months apart. The photographs were taken using the same magnification. Each photograph was cut in half and the halves placed next to each other.



What most likely caused the difference in the apparent size of the Moon in photographs *A* and *B*?

- A) The phases of the Moon changed.
 B) The Moon expanded.
 C) The distance from the Earth to the Moon changed.
 D) The Moon rotated.

3. Which planet has the *least* distance between the two foci of its elliptical orbit?

- A) Venus B) Earth C) Mars D) Jupiter

4. Which planet's orbit around the Sun is most nearly circular?

- A) Mercury B) Neptune
 C) Pluto D) Venus

5. Which object is located at one foci of the elliptical orbit of Mars?

- A) the Sun B) *Betelgeuse*
 C) Earth D) Jupiter

6. The shape of the orbits of most of the planets in the solar system would best be described as

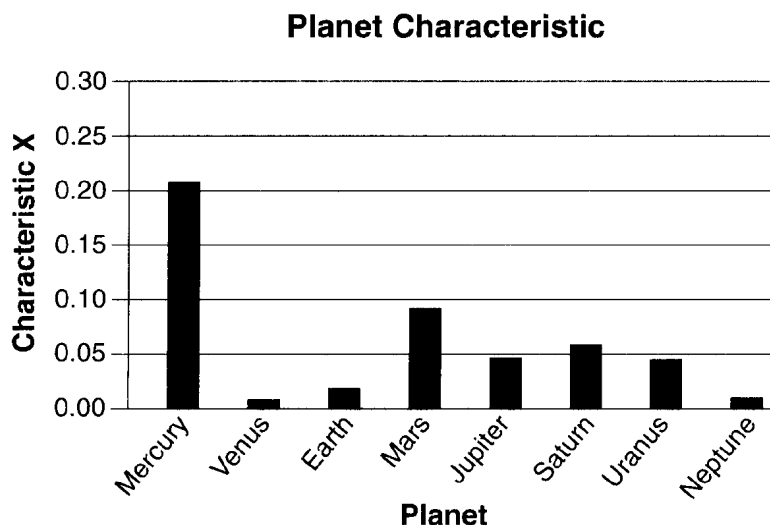
- A) elliptical and very elongated
 B) parabolic
 C) nearly circular
 D) perfectly circular

7. Earth is farthest from the Sun during the Northern Hemisphere's summer, and Earth is closest to the Sun during the Northern Hemisphere's winter. During which season in the Northern Hemisphere is Earth's orbital velocity greatest?

- A) winter B) spring C) summer D) fall

Eccentricity

8. The bar graph below shows one planetary characteristic, identified as X , plotted for the planets of our solar system.

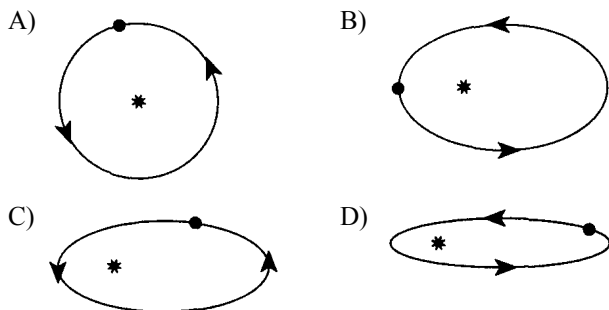


Which characteristic of the planets in our solar system is represented by X ?

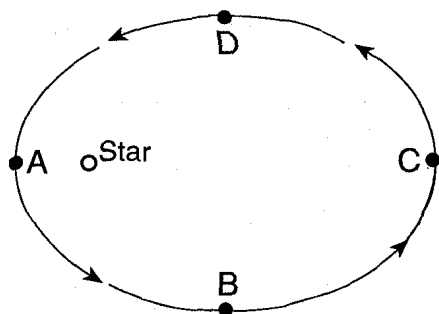
- A) mass B) density C) eccentricity of orbit D) period of rotation

9. Which diagram shows a planet with the *least* eccentric orbit?

(Key: • = planet * = star)



10. Base your answer to the following question on Base your answer to the question below on the diagram below. The diagram represents the path of a planet orbiting a star. Points A , B , C , and D indicate four orbital positions of the planet.



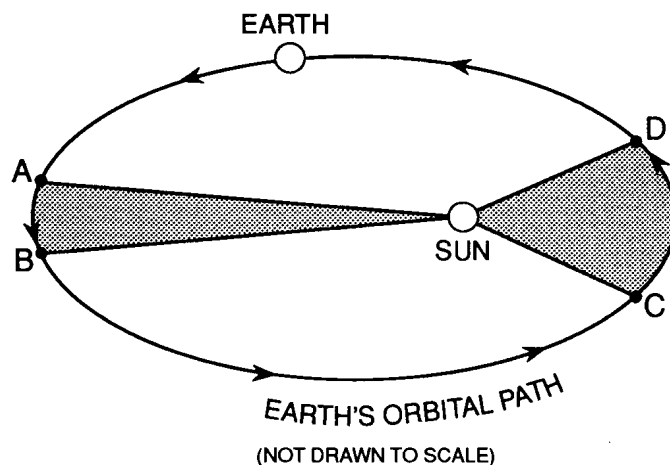
When viewed by an observer on the planet, the star has the largest apparent diameter at position

- A) A B) B C) C D) D

11. The force of gravity between two objects will be greatest if their masses are

- A) small and they are far apart
 B) small and they are close together
 C) large and they are far apart
 D) large and they are close together

12. The diagram below represents the Earth's orbital path around the Sun. The Earth takes the same amount of time to move from A to B as from C to D .

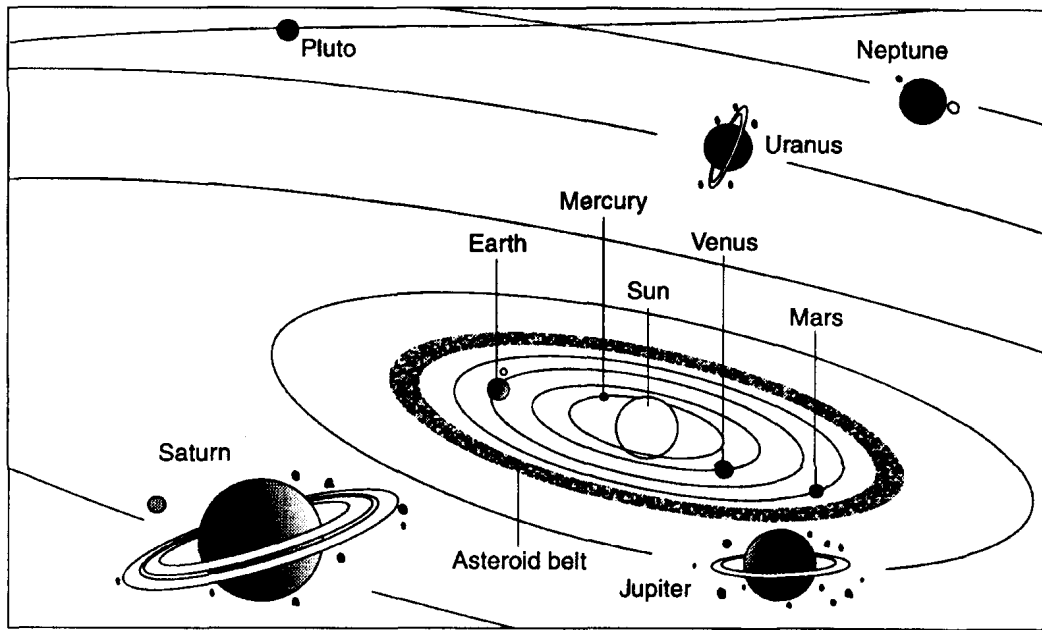


Which values are equal within the system?

- A) The shaded sections of the diagram are equal in area.
 B) The distance from the Sun to the Earth is the same at point A and at point D .
 C) The orbital velocity of the Earth at point A equals its orbital velocity at point C .
 D) The gravitational force between the Earth and the Sun at point B is the same as the gravitational force at point D .

Eccentricity

13. Base your answer to the following question on the diagram of the solar system below.

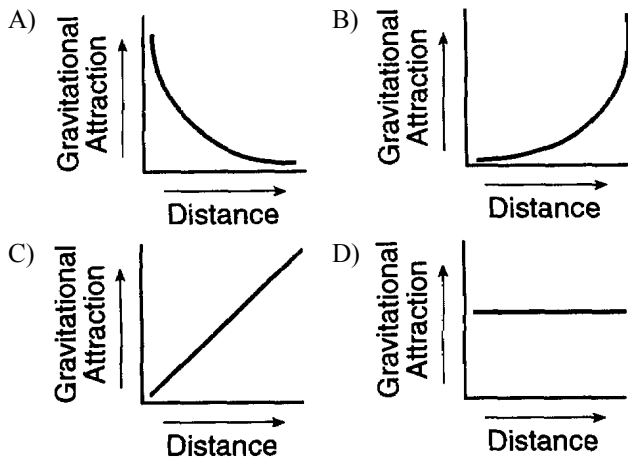


(Not drawn to scale)

According to Kepler's Harmonic Law of Planetary Motion, the farther a planet is located from the Sun, the

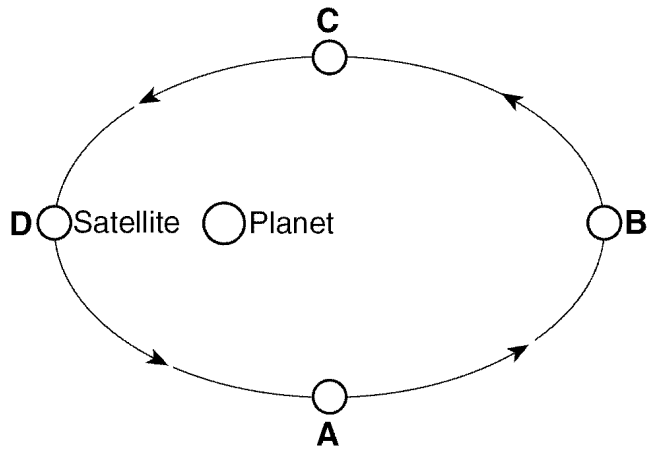
- A) shorter its period of rotation
- B) shorter its period of revolution
- C) longer its period of rotation
- D) longer its period of revolution

14. Which graph best represents the relationship between the gravitational attraction of two objects and their distance from each other?



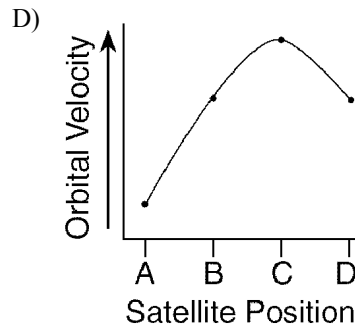
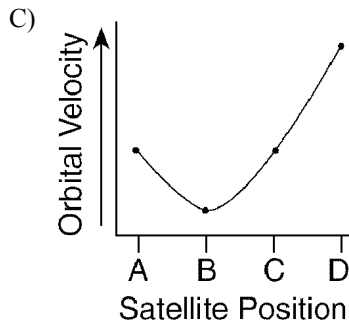
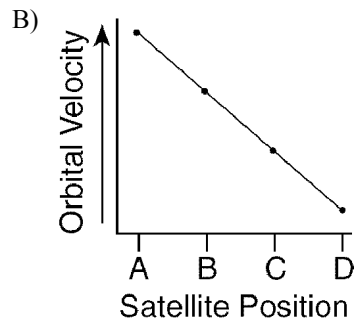
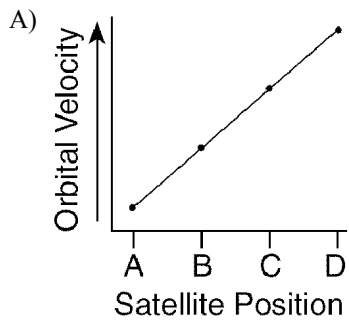
Eccentricity

15. The diagram below shows a satellite in four different positions as it revolves around a planet.



(Not drawn to scale)

Which graph best represents the changes in this satellite's orbital velocity as it revolves around the planet?



Answer Key
kepler

1. B
 2. C
 3. A
 4. D
 5. A
 6. C
 7. A
 8. C
 9. A
 10. A
 11. D
 12. A
 13. D
 14. A
 15. C
-